Remarks

Applicant has carefully reviewed the application in light of the May 26, 2005 Office Action. To advance prosecution, Applicant has amended claims 1, 2, 11, 12, and 13 to clarify the presently claimed concepts. Applicant submits that all of the currently pending claims are in condition for allowance and respectfully requests favorable action.

§ 112, ¶ 2. Rejection to Claim 11

The Examiner rejects claim 11 under 35 U.S.C. § 112, ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Office Action pg. 2. According to Examiner, "[i]n looking to the specification for guidance, these terms of claim 11 are not used in the specification." Id. Applicant disagrees.

Claim 11, as amended, recites:

> The method of claim 1 further comprising:
> deriving a plurality of distributions of said position data in response to a plurality of spring ranges of said valve;
> selecting one of said spring ranges in response to variance of said plurality of distributions.

The specification expresses this subject matter at several points. For example, the specification discusses a method to calculate friction based on rotating a graph (pressure on the x-axis, position on the y-axis) until the spring range line is vertical. ¶ 46; Fig. 4B. The specification also describes how the resulting distribution of the pressures can be used to calculate friction. ¶ 46. As another example, the specification discusses an extension of this method in which the graph does not need to be rotated until the spring range line is vertical. ¶ 47. Instead, this portion teaches that if enough data is present, the spring range can be determined by finding a rotation value that minimizes the variance of the data distribution. The specification illustrates this concept in Figs. 5A and 5B.

The subject matter of claim 11 is therefore supported by the specification. Based on the foregoing, Applicant respectfully requests the Examiner to withdraw the § 112, ¶ 2 rejection thereof.

Allowable Claims

The Examiner objects to claims 5-6 for being dependent on a rejected base claim. Office Action pg. 4. However, the Examiner finds that the claims would be allowable if rewritten in independent form to include the limitations of the base claim and any intervening claims. Id. Applicant thanks the Examiner for this finding.

Section 102 Rejections

The Examiner rejects claims 1-4, 7-10, and 12-13 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 6,272,401 to Boger et al. ("the '401 patent"). Office Action pg. 3. Applicant disagrees.

To anticipate a claim under §102, a reference must teach each and every limitation of the claim. M.P.E.P. § 2131. Furthermore, the elements in the reference must be arranged as the limitations in the claim. Id. The '401 patent, however, fails to teach at least one limitation in each of claims 1-13. Thus, the '401 patent does not anticipate any of the claims.

Claim 1 is an independent claim containing limitations not taught by the '401 patent. Claim 1, as amended, recites:

> A method of performing online valve diagnostics for a valve operating in a process, the method comprising:
> obtaining valve information while said valve operates in response to a plurality of setpoints determined for controlling said process, said valve operating through a series of gradual movements;
> said valve information including at least two of setpoint data, position data and pressure data;
> deriving at least one of step response, friction and spring range for said valve based on said valve information.

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Claim 13 is also an independent claim containing limitations not taught be '401 patent. As amended, it recites:

> A storage medium encoded with machine-readable computer program code for deriving valve characteristics of a valve operating in a process, the storage medium including instructions for causing a controller to implement a method comprising:
>> obtaining valve information while said valve operates in response to a plurality of setpoints determined for controlling said process, said valve operating through a series of gradual movements;
>> said valve information including at least two of setpoint data, position data and pressure data;
>> deriving at least one of step response, friction and spring range for said valve based on said valve information.

Nowhere, however, does the '401 patent teach "obtaining valve information while said valve operates in response to a plurality of setpoints determined for controlling said process" and using this information to derive "at least one of step response, friction, and spring range for said valve." In the '401 patent, valve information is obtained by moving the valve through a special sequence of movements, and the data is analyzed in response to these movements. *See, e.g.,* FIG. 8, steps 360-382; col. 2, ll. 6-16; col. 10, ll. 55-67; col. 11, ll. 1-5; col. 11, ll. 45-51; col. 12, ll. 39-50; col. 13, ll. 27-30, 35-67; col. 14, ll. 1-2, 19-38. In particular, the data acquisition of the '401 patent relies on setting starting positions, movement ranges, and ending positions. *See, e.g.,* col. 10, ll. 55-67; col. 12, ll. 39-50; col. 13, ll. 27-30, 35-67; col. 14, ll. 19-38. These movements are diagnostic tests to gather information and are not determined by the needs of plant operation.

Applicant's application, in contrast, teaches that data can be obtained by "not intervening at all by changing what the process controller does." ¶ 51. For example, the data can be obtained while the valve "operates in response to a plurality of setpoints determined for controlling said process," as specified by claims 1 and 13. Moreover, whereas the derivation of step response, friction and spring range in the '401 patent relies on the data procured through the previously described special sequence of movements, the claims specify that step response, friction and spring range may be derived from valve information obtained "in response to a

plurality of setpoints determined for controlling said process," also as specified by claims 1 and 13. In at least these respects, the '401 patent fails to teach all of the limitations of claim 1 and claim 13, and these claims are distinguishable over the '401 patent.

Claims 2-11 depend from claim 1 and, hence, contain all of its limitations, which have already been shown to distinguish over the '401 patent. Claims 2-11 also contain additional limitations that distinguish over the '401 patent.

For example, claim 2, as amended, recites:

> The method of claim 1 further comprising:
> deriving a model of valve response to setpoint changes in response to said valve information;
> adjusting said model in response to error between predictions generated by said model and actual position information; and
> applying a step input to said model to generate a step response.

Nowhere, however, does the '401 patent teach "applying a step input to said model to generate a step response." In the '401 patent, the step response actually occurs and is physically measured. *See* col. 13, ll. 22-31; col. 14, ll. 19-44. The operation in claim 2, on the other hand, attempts to determine what the step response of the actual system would be by applying a step input to a model. Applicant notes the portion of the '401 patent on which the Examiner relies (i.e., col. 14, ll. 23-30), but this fails to teach "applying a step input to said model to generate a step response." Thus, the operation in claim 2 of "applying a step input to model to generate a step response" is not found anywhere in the '401 patent, and the '401 patent fails to teach all the limitations recited in claim 2.

Claim 3-6 depend on claim 2 and therefore incorporate its limitations. Because the '401 patent fails to teach all the limitations of claim 2, it likewise must fail to teach all the limitations of claims 3-6.

With respect to claims 7-10, Applicant submits that the portion of the '401 patent cited by the Examiner (i.e., col. 13, ll. 53-64) does not teach the following limitations of claim 7: (i) "deriving a distribution of said position data by transforming said pressure data and said position data in response to a spring range of said valve," or (ii) "determining friction of said valve in

response to said distribution." The '401 patent, for example, does not teach of *"deriving a distribution"* of position data, does not teach deriving the distribution *"by transforming said pressure data and said position data,"* and does not teach deriving said distribution "by transforming said pressure data and said position data *in response to a spring range of said valve."* col. 13 ll. 53-64. Thus, Applicant submits that the '401 patent does not teach all of the limitations of claim 7. Moreover, claims 8-10 depend from claim 7 and, hence, contain all of its limitations. Since the '401 patent has already been shown to not teach all of the limitations of claim 7, the '401 patent necessarily does not teach all of the limitations of claims 8-10.

With respect to claims 8 and 9 specifically, Applicant further contends that the '401 patent also fails to teach that "determining friction includes determining a difference between an upper percentile and a lower percentile of said distribution," as recited in claim 8. While Applicant notes the portion of the '401 patent cited by examiner (i.e., col. 13, ll. 53-64), this fails to discuss (i) calculation of friction, (ii) determining a difference between an upper percentile and a lower percentile, or (iii) calculation of friction by using a difference in percentiles. For at least these reasons, Applicant asserts that the '401 patent fails to teach all of the limitations of claims 8-9.

Applicant further submits that examiner erred with respect to claim 11 by misinterpreting the '401 patent. Nowhere does this reference teach of "selecting one of said spring ranges in response to variance of said plurality of distributions." Hence, Applicant asserts that claim 11 contains limitations not taught by the '401 patent.

For at least the foregoing reasons, and for the reasons given with respect to claim 1, Applicant submits that claims 2-11 contain limitations not taught by the '401 patent. Application therefore respectfully requests that the Examiner withdraw the § 102 rejection thereto.

Claim 12 is another independent claim containing limitations not taught by the '401 patent. Claim 12, as amended, recites:

> A system for deriving valve characteristics of a valve operating in a process, the system comprising:

> a process controller generating a plurality of setpoints determined for controlling said process, said plurality of setpoints operating said valve through a series of gradual movements;
>
> a positioner receiving said plurality of setpoints and generating a signal for positioning said valve;
>
> a controller receiving valve information from said positioner while it is operating based on the setpoints, said valve information including at least two of setpoint data, position data and pressure data;
>
> said controller deriving at least one of step response, friction and spring range for said valve based on said valve information.

Nowhere, however, does the '401 patent teach "a controller receiving valve information from said positioner while it is operating based on the setpoints, said valve information including at least two of setpoint data, position data and pressure data." In the '401 patent, valve information is obtained by intentionally moving the valve through a specifial sequence of movements, and the data is analyzed in response to these movements. *See, e.g.,* FIG. 8, steps 360-382; col. 2, ll. 6-16; col. 10, ll. 55-67; col. 11, ll. 1-5; col. 11, ll. 45-51; col. 12, ll. 39-50; col. 13, ll. 27-30, 35-67; col. 14, ll. 1-2, 19-38. In particular, the data acquisition of the '401 patent relies on setting starting positions, movement ranges, and ending positions. *See, e.g.,* col. 10, ll. 55-67; col. 12, ll. 39-50; col. 13, ll. 27-30, 35-67; col. 14, ll. 19-38. These movements are diagnostic tests to gather information and are not determined by the needs of the process.

Applicant's present application, in contrast, illustrates that data can be obtained "by not intervening at all by changing what the process controller does." ¶ 51. For example, the data can be obtained in response to a "plurality of setpoints determined for controlling said process." Moreover, whereas the derivation of step response, friction and spring range in the '401 patent relies on the data procured through the previously described special sequence of movements, the claim specifies that step response, friction and spring range may be derived from valve information generated in response to "a plurality of setpoints determined for controlling said process." In at least these respects, the '401 patent fails to teach all of the limitations of claim 12.

Conclusion

Applicant submits that a good faith effort has been made to advance the prosecution of this application and that the application is now in condition for allowance. If, however, the Examiner thinks that a telephone conference may advance prosecution, Applicant requests that the Examiner contact the below-listed attorney.

Applicant does not believe that this paper requires any adjustment in fees. If, however, Applicant is mistaken, please apply any charges or credits to deposit account 06-1050, with reference to the above attorney docket number.

Respectfully submitted,

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